

Natural and Technological Risks: Geological Hazards Update

OCTOBER 2015

GEOLOGICAL HAZARDS SUBSECTOR OVERVIEW

Geological hazards—including earthquakes, landslides, and volcanoes—threaten millions of people worldwide and can devastate communities in a matter of seconds by destroying homes, causing food and water shortages, adversely affecting health, and disrupting livelihoods. Although geological hazards cannot be prevented, proper mitigation and preparedness efforts can minimize the effects of these disasters and promote resilience, potentially saving lives and reducing the negative economic effects of geological events. USAID’s Office of U.S. Foreign Disaster Assistance (USAID/OFDA) supports geological hazard disaster risk reduction (DRR) programs, which emphasize an “end-to-end” approach that ranges from identifying hazards to helping communities and households reduce the impact of disasters. USAID/OFDA geological hazard DRR activities include monitoring events, supporting early warning systems, and educating at-risk populations and community leaders on proper response processes.

VOLCANO DISASTER ASSISTANCE PROGRAM: A VOLCANO CRISIS RAPID RESPONSE TEAM



VDAP and IG staff use volcano-monitoring equipment to collect and transmit critical data on volcanic activity at Cotopaxi Volcano. (Photo courtesy of VDAP)

Following the 1985 eruption of Nevado del Ruiz Volcano in Colombia, which resulted in an estimated 23,000 deaths, USAID/OFDA and the U.S. Geological Survey (USGS) established the Volcano Disaster Assistance Program (VDAP)—the world’s only volcano crisis response team. Since 1985, USAID/OFDA has provided approximately \$32 million to support VDAP, including nearly \$4.3 million in Fiscal Year (FY) 2015. To date, VDAP teams have responded to 29 major crises and strengthened response capacity in 12 countries. VDAP scientific teams travel to volcanoes throughout the world at the request of host governments and, using volcano-monitoring equipment, work with local and national counterparts to quickly assess hazards and generate eruption forecasts.

Since mid-April 2015, eruptive activity at Cotopaxi Volcano in Ecuador has increased, including volcano-related earthquakes and gas emissions. Located approximately 30 miles south of the capital city of Quito, Cotopaxi is one of South America’s most dangerous volcanoes. A significant eruption could affect tens of thousands of people living near the volcano and inundate nearby areas with lahars—rapidly moving, large volcanic mudflows. In response to the increased activity, USAID/OFDA supported VDAP to deploy a team of five USGS volcanologists to the region in June and July to assist scientists at Ecuador’s Instituto Geofísico (IG). VDAP provided four broadband seismometers, upgraded existing monitoring systems, and assisted with interpreting satellite imagery and seismic data. In September, a three-person VDAP team deployed to Ecuador to provide additional assistance regarding seismic data analysis and lahar detection. As of October 2015, VDAP continued to collaborate with IG to monitor volcanic activity at Cotopaxi, including sharing satellite remote sensing observations and assisting with the evaluation of volcanic unrest and the production of eruption forecasts. For more information about VDAP: <http://volcanoes.usgs.gov/vdap/>

REDUCING RISKS THROUGH EARTHQUAKE DISASTER ASSISTANCE TEAMS

With nearly \$280,000 in FY 2015 funding, USAID/OFDA supports USGS to reduce risks posed by earthquakes through Earthquake Disaster Assistance Teams (EDATs), which comprise geologists, seismologists, and tsunami and landslide experts, as appropriate. To date, EDAT members have collaborated with scientists in countries such as China, Comoros, Haiti, Indonesia, Malawi, Nepal, and Turkey. The scientific data produced from EDAT and local counterparts' assessments improve the understanding of seismic hazards and serve as the basis for the development, adoption, and implementation of appropriate building codes and land-use plans by local and national governments in affected countries. Building codes and land use plans, when properly implemented, can reduce the adverse impacts of earthquakes.



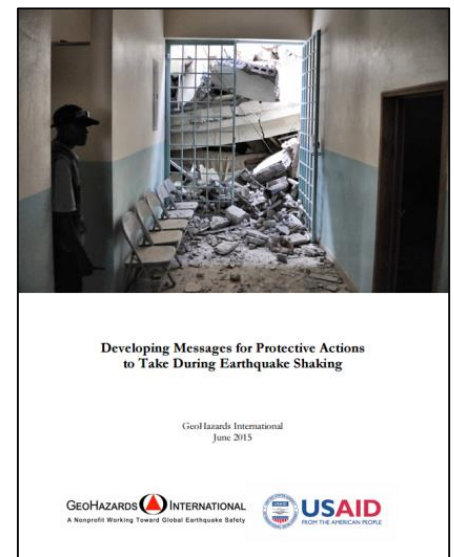
USGS staff and colleagues discuss topographic amplifications at Swayambhunath Temple Complex, Nepal. (Photo courtesy of Dan McNamara/USGS)

Following the magnitude 7.8 earthquake in Nepal on April 25, 2015, a six-person EDAT deployed to Nepal and supported earthquake-related damage assessments, installed and upgraded low-cost seismic monitoring instruments, provided technical assistance on data analysis, and conducted trainings on seismic hazard monitoring. EDAT members collaborated closely with USAID/OFDA partner the National Society for Earthquake Technology–Nepal and the International Centre for Integrated Mountain Development throughout the deployment, while also assessing earthquake-induced landslides in affected areas and projecting landslide hazards for the 2015 monsoon season. Finally, EDAT staff collected geological data across Nepal's Kathmandu Valley to identify liquefaction events—the process of loose soil resembling a liquid during earthquake shaking—during the April earthquake and to improve understanding of liquefaction risks.

PROTECTIVE ACTION GUIDANCE FOR EARTHQUAKE-PRONE DEVELOPING COUNTRIES

Since FY 2013, USAID/OFDA has supported a GeoHazards International (GHI) program to enhance safety procedures during earthquakes in developing countries. The initiative provides local and national authorities guidance on how to craft appropriate, effective, and accurate public safety messages in earthquake-prone areas. As a part of the program, GHI connected professionals responsible for delivering earthquake-related safety messages in developing countries with a variety of technical specialists to discuss appropriate geohazard safety measures. GHI also developed and disseminated guidance outlining criteria and processes for creating local, context-specific messages on protective actions.

With nearly \$300,000 in USAID/OFDA FY 2015 funding, in June 2015, GHI published a manual with evidence-based information that details how public messaging on protective actions during earthquakes can reduce casualties. The document includes key considerations for creating effective messages that serve different contexts. In FY 2016, GHI plans to implement the guidance in select earthquake-prone areas of Haiti to refine and evaluate messaging techniques. Through the project, USAID/OFDA and GHI aim to minimize earthquake-related deaths and injuries, especially among low-income and other vulnerable populations.



With USAID/OFDA support, GHI produced a guidance manual on the process and key considerations for creating effective messages on protective actions during earthquakes.

For more information on the GHI manual: <http://geohaz.org/publications/guidance-on-developing-messages-for-protective-actions-to-take-during-earthquake-shaking.html>

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